PROCEEDINGS OF THE KICKOFF MEETING OF NODAL OFFICERS FOR 'DPR PREPARATION ON REJUVENATION OF GODAVARI, KRISHNA AND MAHANADI RIVERS THROUGH FORESTRY INTERVENTIONS'

INSITITUTE OF FOREST BIODIVERSITY

INDIAN COUNCIL OF FORESTRY RESEARCH AND EDUCATION

DULAPALLY, KOMPALLY S. O., HYDERBAD – 500 100

PROCEEDINGS OF THE KICKOFF MEETING OF NODAL OFFICERS FOR 'DPR PREPARATION ON REJUVENATION OF GODAVARI, KRISHNA AND MAHANADI RIVERS THROUGH FORESTRY INTERVENTIONS' HELD AT INSITITUTE OF FOREST BIODIVERSITY, HYDERBAD

The kickoff meeting of nodal officers for 'DPR preparation on rejuvenation of Godavari, Krishna and Mahanadi rivers through forestry interventions' was held on 7th June 2019 at the Institute of Forest Biodiversity, Hyderabad.

Altogether twenty-eight members attended the meeting as detailed in Annexure I. All the members were provided with the project proposal and a specially printed brochure on DPR Godavari to facilitate proper understanding and discussion.

Shri Pravin H. Chawhaan initiated the programme by welcoming the nodal officers coming from Telangana, Andhra Pradesh, Maharastra, Madhya Pradesh and Chhattisgarh. He informed the house about the background and genesis of the project that is being implemented by ICFRE - 'Detailed project report preparation for rejuvenation of nine major river systems in India through forestry interventions'. Further, he informed that a consultative approach will be followed for DPR preparation that will make the DPR acceptable and implementable by various stakeholders. He hoped that the deliberations will be helpful in formulating a strategy for the rejuvenation of Godavari, Krishna and Mahanadi.

Shri D. Jayaprasad, Director, IFB Hyderabad, formally welcomed the members and informed about the vital role the nodal officers are going to play in their respective states during the DPR preparation and its implementation. He invited the attention of the nodal officers to the agenda and solicited their suggestions. He urged the nodal officers to brainstorm and come up with suggestions on how to go ahead with the DPR preparation. The agenda items are listed below.

- Get a broad understanding about Godavari basin, sub-basins, principal tributaries, its ecology, problems and challenges etc.

- Decide about project area (Riverscape, buffer zone along both banks) for taking up for forestry interventions.
- Besides the Forest Department, identify other stakeholders/implementing agencies.
- Discuss about forestry interventions, watershed and SMC works etc, implemented in their states and their effectiveness, and other agencies involved in such activities in their states.
- Discuss about treatment models implemented in their states and suggest models for various rejuvenation activities.
- Discuss about species (Trees, Shrubs and Herbs) including medicinal plants being planted in their states for watershed treatment and SMC works.
- Discuss about prevailing BSR rates for different plantation activities.
- Discuss possibilities for regeneration and restoration of forest catchments and riparian forests.
- Discuss possibilities for income regeneration activities which can be linked to Godavari rejuvenation project.
- Discuss research and monitoring needs of Godavari rejuvenation project.

A self-introduction followed when each of the nodal officers shared their experiences and their first thought about the project.

- Dr. Lokesh Jaiswal highlighted TSFD's flagship programme 'Telangana Ku Haritha Haram' and the massive plantation activities being taken up under this scheme both inside and outside the forest areas. He hoped that the DPR exercise will come up with a concrete plan having more site-specific interventions that are practicable.
- Shri A. K. Jha highlighted the watershed approach being followed as basis of forestry operations in Andhra Pradesh. He informed that the floodplains of Godavari in Andhra Pradesh are highly productive lands and any forestry interventions in such lands will need support of district administration and social forestry wing. He opined that the 'ridge to valley' approach may be more appropriate for Godavari and Krishna than the five and two km buffer zone approach prescribed for Ganga rejuvenation.

- Dr. Vivek Khandeker shared his experience on Krishna river that originate from Kolhapur forest circle. He informed the audience about the ground work done in Maharashtra and the master plan prepared for the rejuvenation of Bhima river, a tributary of Krishna. He hoped that the meeting will result in some concrete and tangible steps needed for the rejuvenation of these two river systems.
- Shri Vijay Shelke informed that though Godavari originates from forest area, it passes through large tracts of non-forested area, mostly agriculture and wastelands. He highlighted the large-scale plantation activities of Maharashtra Forest Department being undertaken recently in the state of Maharashtra and expressed that all these past interventions need to be taken into account while preparing DPR for rejuvenation of Godavari.
- Dr. A. A. Ansari shared his experiences on Chambal and Weinganga rivers. He informed that a large number of small dams/check dams constructed on these rivers are having a cumulative adverse effect on e-flow and biodiversity of the region. Instead of these check dams some other alternatives may be proposed in the DPR for fulfilling the need of people as well as meeting the ecological requirements. He hoped that the meeting will come up with some concrete suggestions.
- Shri M.K. Choudhary informed the house about the Indravati river which is a tributary of Godavari and passes through 385 km of dense forest areas. Chhattisgarh Forest Department, under CAMPA funding, has prepared a number of DPRs for Nallas contributing water to Indravati. SMC works like Gabion structures, Pucca check dams and Brushwood check dams have been taken up for conservation/rejuvenation of Nallas contributing water to Indravati. He suggested that water logging tolerant species should be planted on revenue lands near to river in order to protect them from soil erosion.
- Shri Krishna Murty informed about the watershed programmes implemented in Andhra Pradesh and highlighted the importance of including other micro-level stakeholders for preparation and implementation of the DPR.
- Dr. Sharad Tiwari raised the issue of privately-owned lands along river course and the challenge it poses for planning any forestry interventions. He informed that about 70% lands along river Mahanadi are privately owned. He suggested that

awareness campaigns on the lines of 'Swachh Bharat' may be needed to convince private land lords regarding the importance of riparian forests on rejuvenation and health of rivers.

- Dr. B.P. Pandey informed about the formation of Godavari River management Board, post bifurcation of Telangana and Andhra Pradesh, to resolve water sharing and other interstate issues between these states. Further, he stated that data pertaining to functional irrigation projects and projects under construction will be shared by GRMB to make the DPR more informative.
- Dr. P.S. Kautiyal suggested to adopt a sub-basin approach, integrating all watersheds within the sub-basin, while preparing the DPR. He gave the example of Integrated Water Resource Plan of Marathwada for Godavari, which is well documented and may be referred while preparing the DPR for Godavari. Likewise, other states have their watershed plans which may also be taken into consideration.
- Dr. C. S. Jha extended the support of NRSC for this National project of importance.
- Shri Shrinivas informed about the models developed for water harvesting structures and plantation models for the erstwhile Andhra Pradesh. He informed that the data pertaining to those models will be shared for the DPR on Godavari.
- Dr. Mohan Karnat briefed the nodal officers regarding preparation of DPR for Krishna River and emphasized the importance of riverscape.

Dr. S. Pattanaik presented an overview of the project covering the background to the project, DPR Ganga, river rejuvenation concepts, Godavari river basin and sub-basins, principal tributaries, riverscape, spatial analysis of riverscape using GIS to select sites for forestry interventions and the proposed multi-stakeholder consultative approach for writing the detailed project report on rejuvenation of Godavari. He concluded the presentation with a slide on role of each state nodal officers in the DPR preparation and implementation. Following discussions were held after Dr. Pattanaik's presentation.

- Dr. Vivek Khandeker informed that the buffer zone prescribed in Ganga DPR for plain areas (5 km along main river and 2 km along tributaries) was based on thumb rule and not any scientific logic. Same was the case with Bhima river where a 2 km buffer was taken along the main river and 0.5 km buffer along the tributaries

flowing on plain lands. He suggested that the contribution of buffer zone i.e. reducing sedimentation in river, recharge of river etc., should be taken into account to decide the width of the riparian buffer. A hydro modelling study taking into account present runoff in the buffer zone and the runoff that is desired to reduce sedimentation load of water will give an idea about the width that should be considered for intervention. He suggested to prepare proposal giving three buffer zones options (5km, 3 km and 1km), with details of the effect of various interventions on runoff and sediment load of water, and the financial implications. This will help the Government choose one of the options.

- Dr. Lokesh Jaiswal opined that there is no doubt that all watersheds on higher reaches need to be included in the riverscape, however, on plain areas our objective need to be defined – reducing water sedimentation may be one of the objectives. The plain areas along rivers need to be scientifically analyzed using various GIS layers like slope, rainfall etc. to identify stressed sites and then intervention models like afforestation, SMC works proposed.
- Dr. C. S. Jha informed the audience about Odum's thumb rule of 2 km buffer along the river course. He suggested to develop a vulnerability index taking into all those parameters affecting rejuvenation of rivers *viz.*, terrain, soil depth, slope, rainfall, population density etc., and use this index to decide a variable buffer strip along the main stem and tributaries. He informed that Remote Sensing and GIS will be very useful as decision support system and making the DPR more knowledge based. Further, he quoted the suggestions of Odum to take a ratio of natural ecosystem and derived ecosystem to decide buffer width. Areas with more natural ecosystem will need less interventions and areas with more derived ecosystem will need more interventions
- Shri Krishna Murty opined that a lot of illegal sand mining is taking place on Godavari riverbeds. The DPR should take into account policies and legislations pertaining to all commercial activities along Godavari and the amount of revenue being generated from all such activities.
- Shri Shrinivas Rao pointed out that many GIS layers have been created for spatial analysis in Telangana and Andhra Pradesh and similar may be available for other

states also. Expertize will be needed to integrate all these GIS layers and for spatial analysis. Proposing various models for intervention will be easy once the GIS analysis identifies the vulnerable sites.

- Dr. P.S. Kautiyal informed that river has its own mechanisms in maintaining flow of water. Any obstruction on its course, increase or decrease of water volume leads to change in water course. Width of buffer and interventions has to be based on gradient. More interventions will be needed on sides having mild gradient. Plantation interventions can be taken up starting from HFL. Species having tolerance to water logging can be planted below HFL also. River embankments can also be thought of on mild slopes beyond which plantation interventions can be proposed.
- Dr. K. K. Pappan opined that project period is another factor which needs to be considered while deciding riparian buffer. Any increase in buffer width will increase area for intervention and increase in the need to collect huge amount of data for spatial analysis. He opined that the layers/thematic maps developed by states may be difficult to combine for the study area. Hence, spatial analysis needs to be done fresh for the basin and riverscape using Landsat/Cartosat/LISS datasets. He proposed that a 2 km stretch may be adopted for main river and 0.5 km for tributaries, and this suggestion was agreed to by the august gathering. Further, he suggested for optimizing the field data collection forms.
- Shri Vijay Shelke opined that there is no issue with implementation of intervention models in natural landscapes and any amount of area can be proposed for such interventions. However, the intervention models proposed for agricultural landscapes need to be acceptable by the stakeholders/farmers. Hence, participation of such stakeholders in the consultative process is important.
- Dr. P. B. Pandey suggested to adopt contour approach to decide the buffer zone as most part of Godavari basin is plateau land. Instead of considering a 5 km buffer, height and slope may be considered as a yardstick to select the land for interventions. He suggested a lesser buffer along the main stem than the tributaries, as mainstem is recharged through tributaries.

- Dr. Mohan Karnat informed the house about the project period which is till March 2020, hence, not much time is available for taking an experimental approach. The contour approach suggested by Dr. P.B.Pandey may not be feasible to study and include in DPR due to time constraints. Hence, it is important that a buffer width is decided by the nodal officers. Further, he informed that the spatial analysis will be done by a GIS vendor by procuring thematic layers from available sources like NRSC.
- Dr. S. Pattanaik informed that a buffer zone of 5 km or 1 km is prescribed as a guideline only and within this buffer zone sites need to be identified for intervention. If the buffer zone is wider i.e. 5 km then the chances of getting sites for intervention will be more, especially in agricultural landscapes
- Dr. A. A. Ansari opined that land use data has significant impact in deciding the river stretch. He suggested studying land use pattern within a 2 km buffer. As far as forestry lands within this buffer are concerned not many interventions will be needed. However, for revenue lands interventions need to be proposed.
- Dr. Saidul shared his working experience under Rural Development Department of Telangana Government. A lot of plantation activities have been taken up on farmer's field, canal banks, avenue lands, institutional areas under Telangana Government's Haritha Haram programme using funding from MNREGA. He informed that most of the areas available outside the forest area have been saturated with plantations. He suggested that some app-based technology should be adopted for field data collection and ground truthing.
- Shri Pravin H. Chawhaan explained the purpose of involving other departments. While some departments will act as implementing agencies, others involvement is limited to data collection for comprehensive review of Godavari basin. Further, he informed that the minimum wages of Government of India as per man days will be adopted while preparing budget estimate. He, also, intimated that 5% ground truthing of sites will be taken up by the IFB Team.
- Shri D. Jayaprasad shared his experience of Kerala river rejuvenation works and suggested the forest departments to select the sensitive areas along river side and

propose suitable models. He emphasized that the outcome of the project must be useful to public.

- Shri Anand Kumar Jha expressed that the DPR has to be realistic and implementable; otherwise it will become a non-starter. Water being a very sensitive issue, it is very likely that the State Governments will offer their full support, however, the DPR need to match up to their expectations. He opined that planning any forestry intervention on private lands will be a real challenge. Further, he suggested that the existing biofiltration and bioremediation models should be thoroughly studied and need to be prescribed as a treatment model wherever needed.
- Dr. G.R.S. Reddy opined that like the Ganga DPR, major chunk of budgetary provision will be made for natural landscapes. Forest Department will play a crucial role in implementing forestry interventions on agriculture landscape also, besides the natural landscape. He informed that a separate chapter on Biofiltration and Bioremediation will be included in the DPR.

The afternoon session started with a presentation from Shri. Prabuddha, DCF, IWST Bangalore, on rejuvenation of Krishna river. He gave an overview of Krishna basin spread across Karnataka, Maharashtra, Telangana and Andhra Pradesh; origin of river and its course, its tributaries, riverscape, approach to be followed and formats for site specific data collection. He informed that IWST, Bangalore has already conducted an inception meeting and some stakeholders have been identified from Karnataka. Dr. Mohan Karnat, Director, IWST requested the nodal officers of Krishna to give their valuable inputs as well as to suggest other stakeholders who can be considered from their respective states.

In continuation to the presentation on Krishna, Dr. Sharad Tiwari, Scientist-F, IFP, Ranchi gave a presentation on ‘DPR preparation for rejuvenation of Mahanadi River’. He gave an overview on Mahanadi river basin spread across Chhattisgarh, Odisha, Maharashtra, Madhya Pradesh and Jharkhand; origin of river Mahanadi, tributaries and distributaries, riverscape, sub-basins, topography, LU/LC pattern along the river course, active flood zones, rainfall pattern in the Mahanadi basin, agroecological zones, GIS layers needed for

spatial analysis etc. He informed the house that IFP, Ranchi has scheduled their inception meeting with the identified stakeholders for 10th June 2018, at Bhubaneswar, Odisha.

Following the three presentations on Godavari, Krishna and Mahanadi, a panel discussion was held. The Nodal Officers expressed their views and gave valuable suggestions on the approach to be adopted for DPR preparation. Following suggestions emerged from the panel discussion.

1. As there is no existing scientific study for deciding the width of riparian buffer, the Nodal Officers agreed for spatial analysis in a 2 km buffer zone along main stem and 0.5 km along major tributaries to assess and identify the extent of area available for forestry interventions. This initial spatial analysis will be used as a guide to either increase or decrease the width of riparian buffer to be included in DPR. Besides the riparian corridor on plain lands, all watersheds beyond 750 m altitude will be included in the riverscape.
2. As river rejuvenation aims at both qualitative and quantitative improvement of river water (Aviral Drara, Nirmal Drara and Avant Van) some monitorable indicators *viz.*, Physico-chemical attributes of river water, Ground water level in riverscape, Siltation, Biodiversity of riverscape, increase in forest cover and its carbon sequestration potential, increase in number of SMC structures and its effect on ground water level/river flow etc., need to be identified for periodic monitoring and to evaluate the success of the project.
3. Spatial analysis of riverscape need to completed as soon as possible to identify potential areas for forestry interventions and to decide the interventions *viz.*, plantation models, SMC works, riverfront development works, Eco parks etc. Identified potential areas need to be communicated to the concerned state nodal officers before initiation of site specific data collection in the Formats 1-4.
4. All interventions proposed in the DPR have to be linked to National Goals (National Forest Policy and National Water Policy) and International commitments (Sustainable Development Goals) so that funding can be secured from International agencies for its implementation.

5. The Nodal Officers will go through the site-specific data collection formats and suggest modifications, if required.
6. The Nodal Officers will intimate the suitable dates for conducting Stakeholder meeting in their respective states taking into consideration the monsoon planting operations of their states.
7. DPR need to have a separate and detailed chapter on Biofiltration and Bioremediation.
8. The GIS wings of state Forest Departments will provide the watershed layers and forest boundary layers for their respective states.
9. Besides the eight major tributaries proposed for inclusion in the riverscape, Nodal officers agreed to include Kinnerasani as the ninth tributary.

The meeting was concluded with a vote of thanks from Dr. G.R.S. Reddy.

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ANNEXURE – I

List of Participants

Sl.No.	Name of the Officer	Organization
1.	Shri D.Jayaprasad, IFS, Director/Project leader for DPR Godavari	Institute of Forest Biodiversity, Hyderabad
2.	Shri N. Mohan Karnat, IFS, Director/Project leader for DPR Krishna	Institute of Wood Science and Technology, Bengaluru
3.	Shri Lokesh Jaiswal, IFS, APCCF & Nodal Officer Godavari, Telangana	Telangana State Forest Department
4.	Shri Anand Kumar Jha, IFS, APCCF & Nodal Officer Godavari, Andhra Pradesh	Andhra Pradesh State Forest Department
5.	Shri Vivek Khandekar, IFS, CCF Pune Circle and Nodal Officer Krishna	Maharashtra State Forest Department
6.	Shri Shelke.V.S., IFS, CCF Nashik Circle & Nodal Officer Godavari	Maharashtra State Forest Department
7.	Dr. C. S. Jha, Scientist & Head, Forest Ecology Divison	National Remote Sensing Centre, Hyderabad
8.	Shri S. R. Natesh, CF, Karnataka	Karnataka State Forest Department
9.	Dr. H. R. Prabuddha, IFS, DCF & Nodal officer Krishna, IWST	Institute of Wood Science and Technology, Bengaluru
10.	Shri Krishna Murthy, DCF, APFD	Andhra Pradesh State Forest Department
11.	Shri M. K. Chowdhary, DCF, Deputy Director ITR, Chhattisgarh/ Nodal officer Indravati river	Chhattisgarh State Forest Department
12.	Shri Ansari, IFS, DCF/ Nodal officer Indravati	Madhya Pradesh Forest Department
13.	Shri P. Shrinivasa Rao, DCF	Telangana State Forest Department
14.	Dr. Saidul, DCF	Telangana State Forest Department
15.	Shri B. P. Pandey, IES	Godavari River Management Board, Hyderabad

16.	Shri P.S. Kautiyal, IES	Godavari River Management Board, Hyderabad
17.	Dr. K. K. Pappan, Retired Scientist, ISRO	National Remote Sensing Centre, Hyderabad
18.	Dr. Sharad Tiwari, Scientist F/ Nodal officer Mahanadi (All states)	Institute of Forest Productivity, Ranchi
19.	Dr. G. R. S. Reddy, Scientist G /Co-ordinating Officer Godavari, for Telangana	Institute of Forest Biodiversity, Hyderabad
20.	Shri Pravin. H. Chawhaan, Scientist G/GCR/ Co-oridnator Godavari (All states) & Maharashtra state	Institute of Forest Biodiversity, Hyderabad
21.	Dr. Ratnaker Jauhari, IFS, CF/Co-ordinating Officer, for MP & CG	Institute of Forest Biodiversity, Hyderabad
22.	Dr. S. Pattanaik, Scientist F/Nodal Officer, Godavari (All states) & Co-ordinating Officer for Odisha	Institute of Forest Biodiversity, Hyderabad
23.	Dr. Abha Rani, Scientist E/ Team member Godavari, Maharashtra	Institute of Forest Biodiversity, Hyderabad
24.	Shri P. Arulrajan, IFS, DCF/ Co-ordinating Officer for Andhra Pradesh	Institute of Forest Biodiversity, Hyderabad
25.	Dr. Deepa M., Scientist C/ Team member Godavari, Karnataka	Institute of Forest Biodiversity, Hyderabad
26.	Mr. M. B. Honnuri, Scientist C/ Team member Godavari, MP &CG	Institute of Forest Biodiversity, Hyderabad
27.	Mr. Pankaj Singh, Scientist B/ Team member Godavari, Maharashtra	Institute of Forest Biodiversity, Hyderabad
28.	Dr. Shaik Shabuddin, Research Scientist	Guntur University, Guntur

Figure 1: Group photo of project team comprising State Nodal Officers, other Stakeholders and IFB team

Figure 2: Presentation on the proposed approach for 'DPR preparation for rejuvenation of Godavari river'

Figure 3: Discussion on river rejuvenation issues